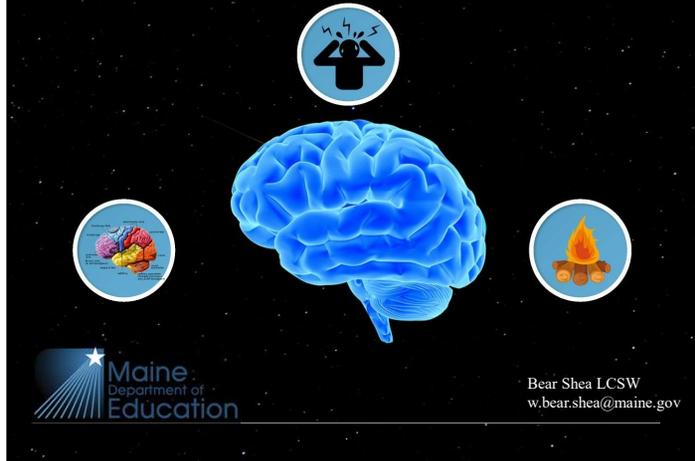


Survival and The Brain:
Neuroplasticity, Stress and Trauma



Maine
Department of
Education

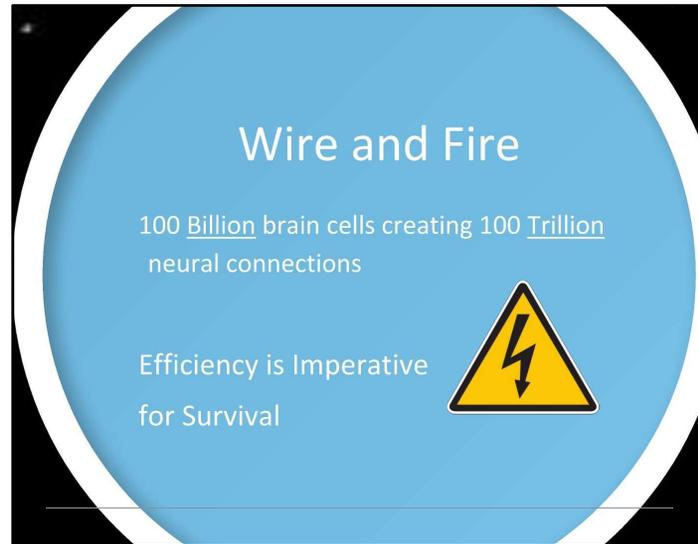
Bear Shea LCSW
w.bear.shea@maine.gov

Cogito

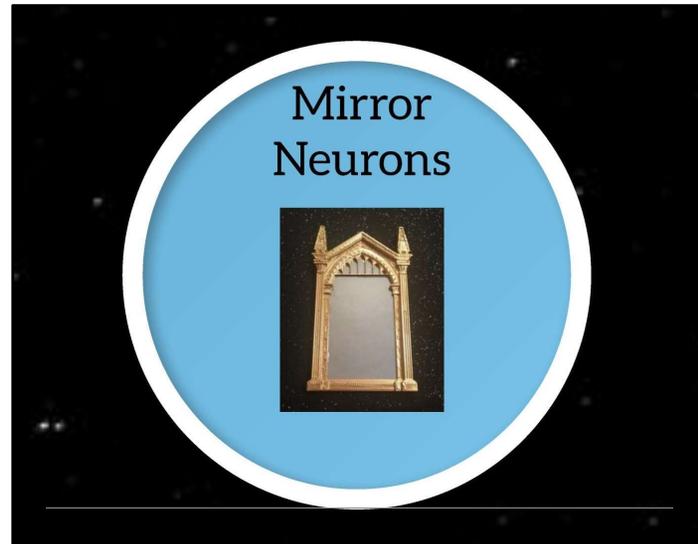
Ergo Sum

Wires and Fire

DANGER

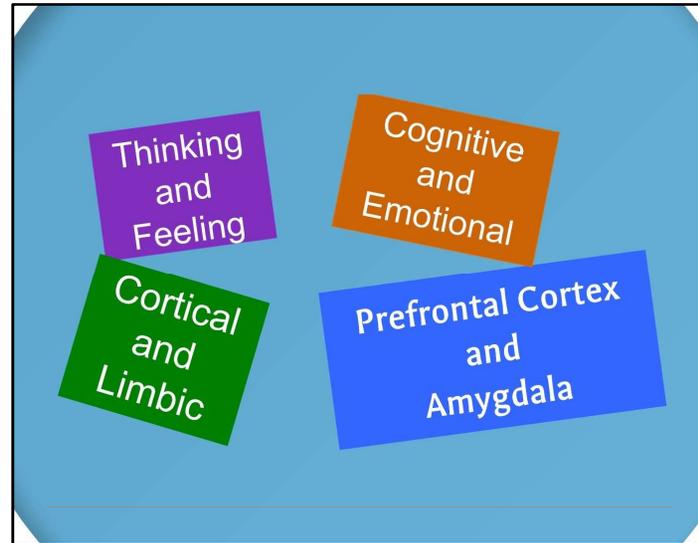


- Neurons want to make connections and work to create as much efficiency as possible.
- Practice creates connections that begin to align together and automatically fire in response
 - example: first time you throw a free throw, then practice allows you to get better, eventually you do this without thought as connection fire together
- this generalizes to other related things
 - Example: professional basketball player being able to pick up any item and throw it into a trash can and being more likely to make it even though it isn't a ball
- This means that we are built to respond to things efficiently and when this comes to survival it means being able to stay alive based on how we have survived in the past



Fascinating area of study that is constantly coming out with new information

- Specialized neurons that are built to replicate movements of others
 - Example: when I'm talking and moving my hands there is a little you in your head making the same movements
- These neurons send the information to the brain where it is interpreted
 - This means that my moving my hands around could be perceived as friendly or threatening depending on the amygdala's response



Talk about brain in general

- How there is new information and studies coming out all the time
- Only going to focus on three major structures

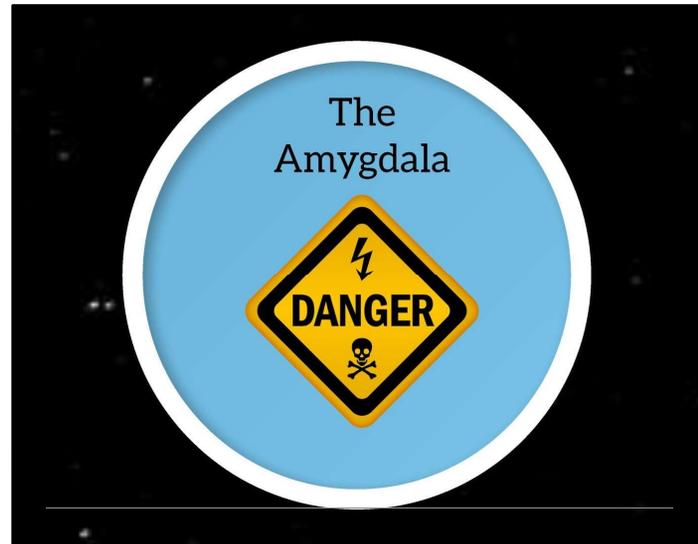
Prefrontal Cortex PFC (Front of the skull forehead)

- Who we are
- Trouble shooting, problem solving, unique to humans more developed than other animals
- Analytical and built to process, long term planning
- The are we are taught to help students develop
- Doesn't fully develop until 25 and goes through several times of developmental "unpacking" ages 5, 11, 16

Hind Brain "mammalian brain" (top of spinal column)

- Where our instincts live
- Short term survival focus

- All animals have this
- Built to keep us alive

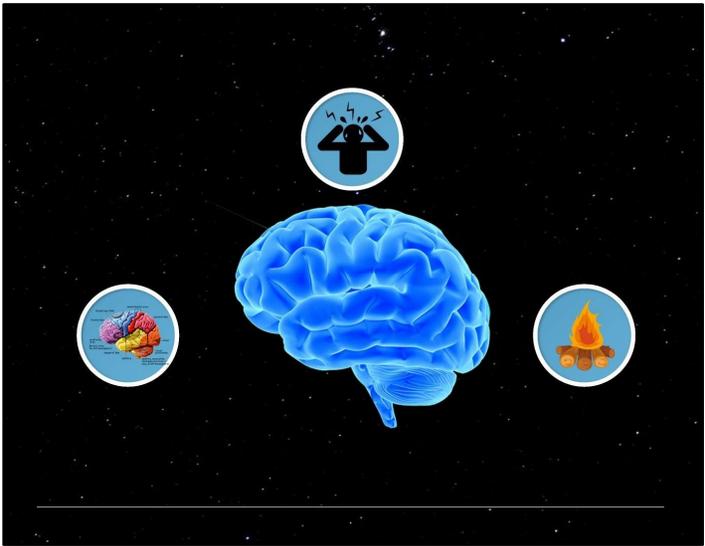


Amygdala

- alarm center of brain
- constantly looking for threat think of a radar for safety

How these structures work together to keep us alive:

- Amygdala senses threat, sends the alarm out
- Because the prefrontal cortex is focused on analyzing it is too slow to be able to react to threat
 - The amygdala turns off the prefrontal cortex to allow the hindbrain to take over
 - Example: people connected to brain scans and shown pictures. When there are calm images shown the whole brain is “lit up” when a threatening picture is shown (kujo in attack mode) the amygdala fires, prefrontal goes dark, hindbrain moves into survival





- When our amygdala goes off and our prefrontal cortex begins to go dark, our survival brain kicks in to keep us alive
- There are four types of survival skills that ALL animals use. (don't reveal those yet)



- Many of us are familiar with the first survival methods...
- One of the easiest survival modes to observe because that is its purpose, to let others know that they risk being harmed if they continue to threaten the person
 - What animals can you think of that use fight to survive?
 - Not to hunt but when they are threatened
 - Ex. Normally people come up with big predator animals like lions. I like to use a chihuahua backed into a corner as people can easily picture a tiny animal acting as if it was a lion. This is good to get across that these survival skills can be used by anyone and that they can often seem irrational (as they are because the prefrontal cortex is off)



Flight is using that energy to get away from a threat

- - What animals can you think of that use flight to survive?
 - Ex. Participants usually come up with deer, zebras sometimes birds which can get a laugh because of the literalness



Fight and Flight are both on the same side of the coin.

- The brain releases adrenaline to increase heart rate
- Blood flow moves out to limbs to increase origination and strengthen muscles to run or fight
- Cortisol and other chemicals are released to turn off any long term body functions to save the energy to

survive

- Digestion and metabolism are put on hold as well as sexual reproduction
- the brain does this because why waste the energy if your don't survive this incident so all

focus is put on the NOW

- Because the PFC is off there isn't any long term memory storage or ability to be aware of

long term consequences of these actions

- the more dysregulated the brain, the less rational the survival response which is why

when we see someone who is dysregulated we don't understand or why there is sometime a really big reaction to a seemingly inconsequential thing

Fight and Flight

What it Looks Like:

- Physical or Verbal Aggression
- Stomping, pacing
- Breaking/Striking Objects
- Incoherent rants
- Running away from situation
- Leaving home/school
- Poor decision making
- Saying things that are extreme and harmful to others
- Suicidal thoughts
- Self harm

Response to Interventions:

- Increase in dysregulation to any perceived power
- Reduced ability to engage in cognitive discussions
- Black or white thinking
- Focused on immediate threat and not long term consequences
- Doing anything to get out of conversation
- Psychomotor agitation often perceived as disrespectful
- Shift to [FIGHT](#) or [SUBMIT](#)

Response to Support:

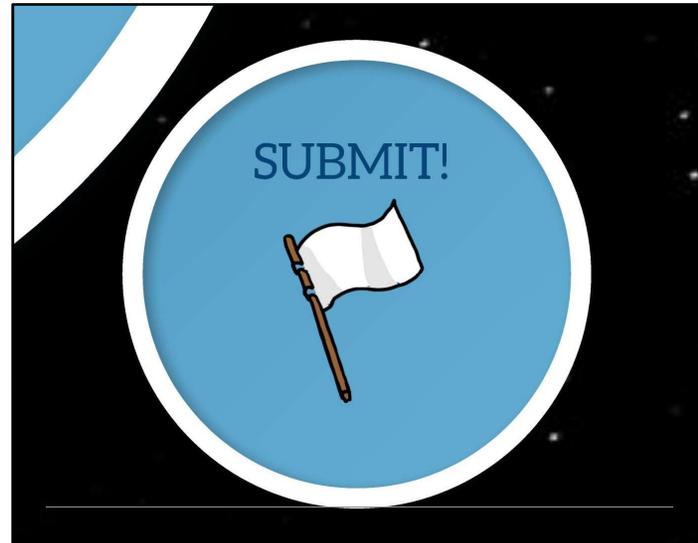
- Deny that there is any need for support
- Actively avoid positive peers or mentors
- Increase in reactive behavior
- Shift to [FIGHT](#) or [SUBMIT](#)

This is a simple way of seeing how fight/flight looks and then ways that a dysregulated brain could respond to interventions and even supports until it regulates which is why any intervention that relies on questions or talk

Could increase dysregulation or cause the person to change to a different survival method



- Freeze is another survival mode that we may be familiar with.
- What animals can you think of that use freeze to survive?
 - Ex. Many people bring up the opossum if this happens ask them to hold onto that one for a minute. Deer are a very good example as people often think of flight as their survival mode however deer first rely on freeze because their natural predator, wolves, can run down a deer over the long haul so they need to rely on freeze and camoflague. Good place to talk about evolution not keeping up with technology as deer freeze in the headlights OR talk about the freezing goats who, due to human breeding for other traits, lead to a recessive trait of their bodies becoming ridged when they are threatened
- Talk about what freeze might look like in our students



- Submit is the newest addition to understanding survival methods. The idea is that, in order to survive, to get through a situation where our lives are threatened, that we do whatever it takes to survive. That we give in and appear non threatening so that we can get through. If we think about some of the worst things humans do to each other, we know that submit makes a lot of sense of how we survive.

- What animals can you think of that use submit to survive?
 - Ex. This is a place to go back to the opossum or bring it up if people are struggling to think of one. The idea that they don't just "play dead" but that biologically their heart rate decreases and they give off a "dead" smell.
 - There is a salamander that lies still when it is attacked and can detach its tail that wiggles so that the predator goes after it while the salamander then sneaks away. Ask if anyone knows what Yellowstone suggests on surviving grizzlies. You cant fight them, you cant outrun them (they climb trees) and standing there they take as a threat so you are supposed to play dead and let them bat you around and hope they don't view you as a threat and leave you alone



Freeze and Submit are the other side of the same coin fight and flight are on.

- The brain releases neuro chemicals to reduce heart rate
- Blood flow moves out from the limbs pad around the organs and protect them from blunt trauma
- People can report feeling cold, numb or light headed
- Cortisol and other chemicals are released to turn off any long term body functions to save the energy to

survive

- Digestion and metabolism are put on hold as well as sexual reproduction
- the brain does this because why waste the energy if your don't survive this incident so all

focus is put on the NOW

- Because the PFC is off there isn't any long term memory storage or ability to be aware of

long term consequences of these actions

- the more dysregulated the brain, the less rational the survival response which is why

when we see someone who is dysregulated we don't understand or why there is sometime a really big reaction to a seemingly inconsequential thing

Freeze and Submit

What it Looks Like:

- Non responsive
- Yes/No answers only
- Agreeing to anything said
- Self deprecation
- Isolation from supports
- Chronically late or absent
- Excessive sleeping
- Self harm
- Suicidal thoughts

Response to

Interventions:

- Increase dysregulation to any perceived power
- Emotionally flat
- Agreeing to all that is said
- Not engaged
- May fall asleep
- Black or white thinking
- Perceived as not caring and disrespectful
- Shift to **FIGHT** or **FUGHT**

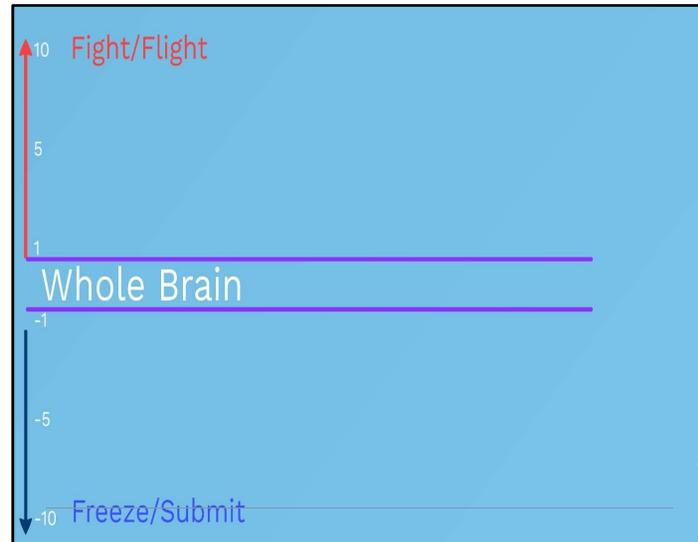
Response to Support:

- May be present but not engage
- Agreeing to all that is said
- Missing support meetings
- Unable to remember past interventions
- Increase in avoidant behavior
- Emotionally flat or unavailable
- Shift to **FIGHT** or **FUGHT**

This is a simple way of seeing how freeze/submit looks and then ways that a dysregulated brain could respond to interventions and even supports until it regulates which is why any intervention that relies on questions or talk

Could increase dysregulation or cause the person to change to a different survival method

- You can compare how similar the responses are even though fight/flight seem so different



This Window of Tolerance is a great way to visualize/teach our brains survival response.

- The middle of the space is called “the window”\
 - When in our window, our whole brain is online
 - We have our amygdala to point out threats, our survival brain to prepare ourselves and our PFC to analyze the validity of the threat
 - Ex. If we are only in our PFC and we needed to cross the street we would be hit by a car because we wouldn't be aware of the threat
 - If we are only in our survival brain then we would never cross the street because of the possibility of getting hit
- As our brains become dysregulated then we move towards FF or FS we can use a scale of 1 – 10 for FF or -1 to -10 for FS
 - The closer we get to 10/-10 the more we are using our primal survival response and have less PFC online and are therefore less rational
- **Interesting things to note:**

- It is usually obvious when someone is in FF and we are trained to identify and to “de-escalate” someone in that space
 - This means that when we attempt to de-escalate our approach may have the effect of changing a persons survival response. This can be obvious when we may see a student go from a Flight mode to a space where they feel they cant get away and so they switch to a Fight mode.

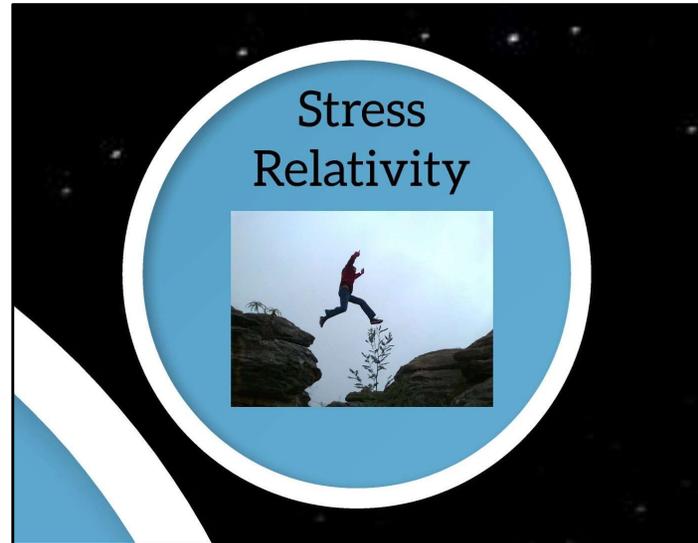
- More interestingly is that when we consider submit as a survival mode, there may be situations where we are addressing a student who is in FF and there response is increasingly dysregulated and escalating towards a more primal response then the principal shows up and the students response drastically changes or we say that if they don’t change their behavior we will call parents, principal etc and that their response is to change and become more compliment or respectful in response to this. This isn’t place where we have de-escalated the student and that even though they are complying and may even be sitting down and doing what was asked that we have helped them “calm down”. It is more likely that because the survival mode they were using, Fight/Flight wasn’t working and that the threat of involving another authority was significant enough that they just switched to another survival mode, Submit. So a students brain was at a 5 in FF and now they are sitting at their desk doing the work that they were having a fit about a minute earlier and instead of being regulated they are at a -5 in Submit.
 - We aren’t taught about this in classroom management or de-escalation. We aren’t even taught about being aware that this could happen

- As stated, when our brains begin to approach the extremes of dysregulated survival mind, the PFC goes offline and so we are not acting “rationally” we are acting out of a primal need to survive.
 - At its most dysregulated 10/-10 we are so desperate to survive, without the PFC we no longer recognize what is a threat and this can allow our brains to disconnect from our interconnectedness and dehumanize ourselves and others.
 - This is how extreme violence can come from the survival brain with violence towards others on the FF side and with violence towards self on the FS side as the ultimate escape from the situation

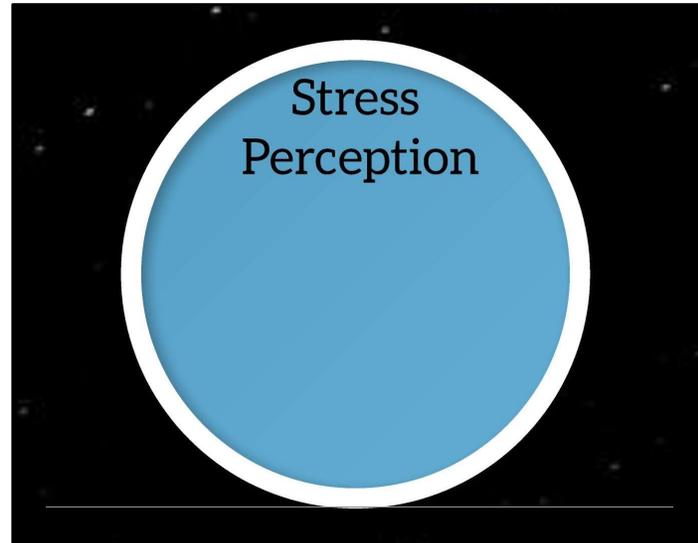




This section is for stress... stress is something that we all experience and understanding it for everyone allows us to have a better understanding of how a brain that has experienced trauma might react.



While we may think we have an understanding that stress is relative we rarely give it much thought
- When we think about how brains wire and fire and are designed to create efficient responses, then we can begin to see how experience over time can change how we perceive stress and that things that are quite ordinary for some can be significant barriers for others



- We are now familiar with the way that the amygdala works and if we think about how experience can play into the sensitivity of the amygdala response and the near automatic shift from whole brain to survival brain it can cause us to look at stress in a different way.
- What one amygdala may think about a picture may be different for others



I would bet many of us are seeing this image and thinking about relaxing vacation on the beach and umbrella drinks
- this is a good place to ham it up with how bad the weather is here etc. we want to lull them into a relaxed mood for the next slide

- “However, there are some amygdalas who see that same picture and instead of umbrella drinks.... They immediately think this (change to shark slide)



This is the power of perception and how our amygdalas are trained by our experiences. This is for all of us and we can imagine that if someone has a history of traumatic experiences that their amygdala may have very different perceptions so that it can act to keep them alive



Neural Regulation

Regulation is not “Happy”

- A regulated state is having your whole brain online and prepared to use all faculties to perceive, assess and choose the appropriate interaction.

- All of us are at our best, our most US when we are in neural regulation
 - This doesn't mean “happy” or even content
 - It means our whole brain is online and able to take in the information
- When we think about the window model with FF/FS the ideal is having our whole brain online
 - This means having our amygdala to warn, PFC to rationally assess and hind brain to react
 - We want to support each other and students to return to a regulated state where they have their PFC online before we work to process an event that caused dysregulation. Using relationship and safety can help go through a dysregulated event and help keep the PFC online so that it can be processed.
 - When the PFC is online it can assess that the dysregulation that happened was because of the survival response and that that response isn't required... this is where change can begin to

Functional Dysregulation



Functional Dysregulation

When dysregulation or attempts to manage are perceived by the culture as valued traits, denoting success and are encouraged and even celebrated.

- Diet or Fitness
- Perfectionism
- Cleanliness
- "Workaholic"
- Perfect Parenting
- Grades
- Hobbies
- Control
- Cleanliness
- Exercise
- Organization
- "Absolute" Thinking

Discuss that these are in the extreme and could be viewed as compulsive versions of these behaviors

After examples discuss suicide rates in Japan where culture places high emphasis on dedication to work or happiness scales in other countries. Relate that education field has some of the highest happiness ratings in the US although teachers have a significantly higher number of reported ACEs than other working populations

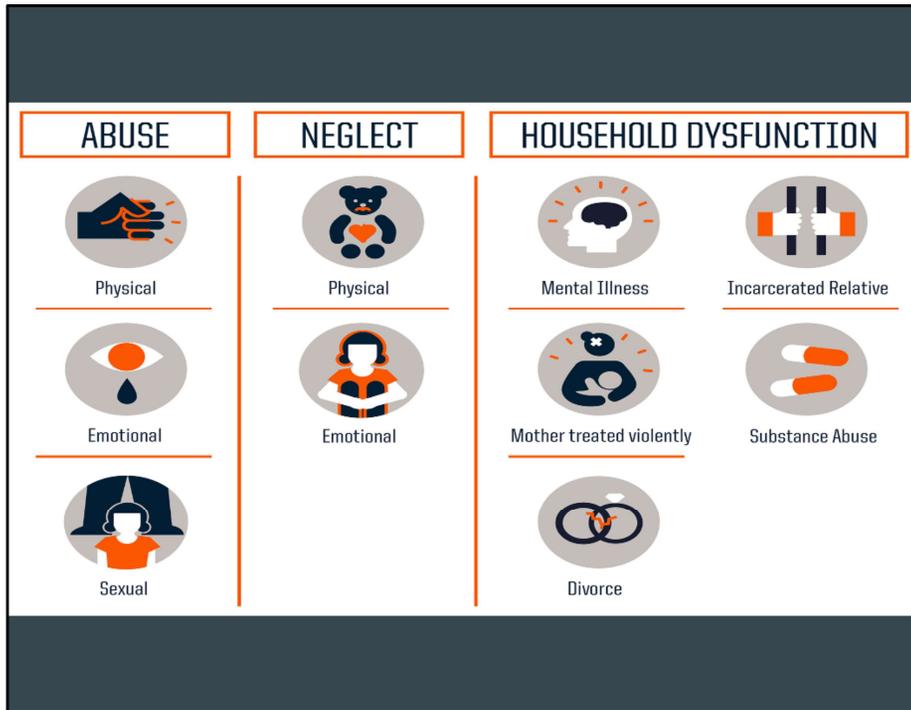
Adverse Childhood Experiences (ACE)

- ACE Score determined by sum of different categories reported by participants.
- ACEs are common. Almost two-thirds of study participants reported at least one ACE, and more than one in five reported three or more ACEs.
- ACEs and negative health and well-being outcomes across the life course.

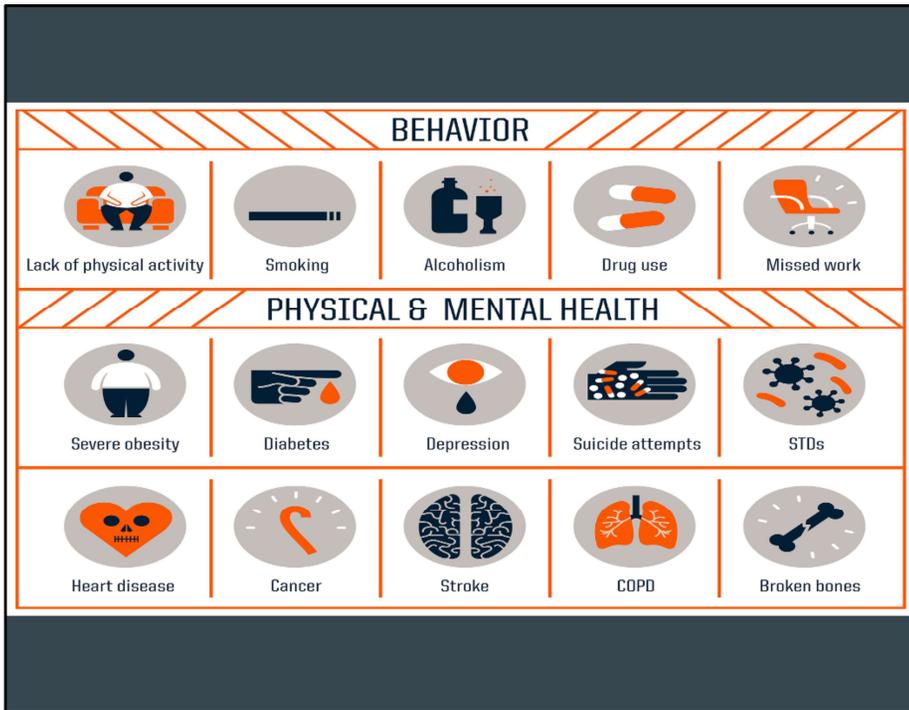
Mid 1996-1998s study of 17,337 Kaiser Permanente HMO patients.

The study was a joint effort by Kaiser Permanente and the Centers for Disease Control.

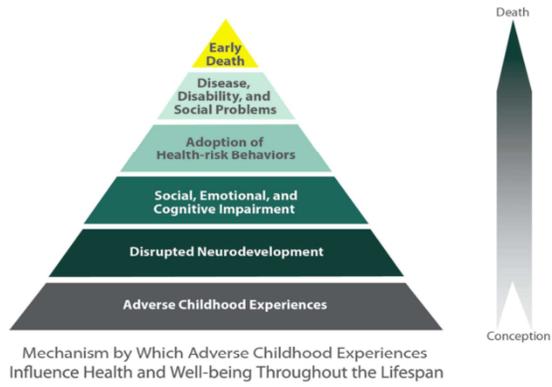
The study found a direct correlation between adverse childhood experiences including



- Physical abuse
- Sexual abuse
- Emotional abuse
- Physical neglect
- Emotional neglect
- Mother treated violently
- Household substance abuse
- Household mental illness
- Parental separation or divorce
- Incarcerated household member



And a whole series of negative life outcomes in adulthood depicted in this image. The common denominator here is higher ACE scores are directly correlated with direct increase in these categories



Outcomes for people with high ACEs scores (without interventions)

References

- Myers DG, Diener E. (1996). The pursuit of happiness. *Scientific American*. 274(5):70–72. Lyubomirsky S, Sheldon KM, Schkade D. (2005). Pursuing happiness: the architecture of sustainable change. *Review of General Psychology*. 9(2):111–131.
- Nettle D. (2005). *Happiness: the science behind your smile*. Oxford University Press.
- DeNeve KM, Cooper H. (1998). The happy personality: a meta-analysis of 137 personality traits and subjective well-being. *Psychological Bulletin*. 124(2):197–229.
- Magnus K et al. (1993). Extraversion and neuroticism as predictors of objective life events: a longitudinal analysis. *Journal of Personality and Social Psychology*. 65(5):1046–1053.
- Tellegen A et al. (1988). Personality similarity in twins reared apart and together. *Journal of Personality and Social Psychology*. 54(6):1031–1039.
- Saudino KJ, Plomin R. (1996). Personality and behavioral genetics: where have we been and where are we going? *Journal of Research in Personality*. 30:335–347.
- Lykken D, Tellegen A. (1996). Happiness is a stochastic phenomenon. *Psychological Science*. 7(3):186–189.
- Diener E et al. (1999). Subjective well-being: three decades of progress. *Psychological Bulletin*. 125(2):276–302.
- Myers DG. (2000). The funds, friends, and faith of happy people. *American Psychologist*. 55(1):56–67.
- Easterlin RA. (2003). Explaining happiness. *PNAS*. 100(19): 11176–11183.
- Solnick SJ, Hemenway D. (1998). Is more always better? A survey on positional concerns. *Journal of Economic Behavior & Organization*. 37:373–383.
- Easterlin RA. (1995). Will raising the incomes of all increase the happiness of all? *Journal of Economic Behavior and Organization*. 27:35–47.

More References...

- Diener E, Biswas-Diener R. (2002). Will money increase subjective well-being? *Social Indicators Research*. 57:119–169.
- Diener E, Lucas RE, Scollon CN. (2006). Beyond the hedonic treadmill: revising the adaptation theory of well-being. *American Psychologist*. 61(4):305–314.
- Butler AC et al. (2006). The empirical status of cognitive-behavioral therapy: a review of meta-analysis. *Clinical Psychology Review*. 26:17–31.
- Sheldon KM, Lyubomirsky S. (2006). How to increase and sustain positive emotion: the effects of expressing gratitude and visualizing best possible selves. *Journal of Positive Psychology*. 1:73–82.
- Burton CM, King LA. (2004). The health benefits of writing about intensely positive experiences. *Journal of Research in Personality*. 38:150–163.
- Seligman MEP et al. (2005). Positive psychology progress. *American Psychologist*. 60(5):410–421.
- Pennebaker JW. (1997). Writing about emotional experiences as a therapeutic process. *Psychological Science*. 8(3):162–166.
- Emmons RA, McCullough ME. (2003). Counting blessings versus burdens: an experimental investigation of gratitude and subjective well-being in daily life. *Journal of Personality and Social Psychology*. 84(2):377–389.
- Sheldon KM, Lyubomirsky S. (2006). Achieving sustainable gains in happiness: change your actions, not your circumstances. *Journal of Happiness Studies*. 7:55–86.
- Sheldon KM, Lyubomirsky S. (2004). Achieving sustainable happiness: prospects, practices, and prescriptions. In A. Linley & S. Joseph. Eds. *Positive psychology in practice*. pp. 127–145. John Wiley & Sons.
- Karremans JC et al. (2003). When forgiving enhances psychological well-being: the role of interpersonal commitment. *Journal of Personality and Social Psychology*. 84(5):1011–1026.
- Tauler JR. (2006). *Mu stroke of insight: a brain scientist's personal journey*. Viking.

Acknowledgements:

- **Hand/Brain Model:** Dan Siegel
- **Mindsight:** The New Science of Personal Transformation. New York: Bantam Books, 2010.
- **Window of Tolerance (Base):** Pat Ogden
- Ogden, P., Minton, K., and Pain, C. (2006). Trauma and the body: A sensorimotor approach to psychotherapy. New York: Norton
- **Window of Tolerance (Advanced):** Deb Dana LCSW, Tracy Morton Stanford LCSW, Phil Devoe LCSW
- Island Institute for Trauma Recovery <http://iitrme.com/>
- **Collaborators:**
- Susan Burns-Chong LCSW